THE ADVOCATE OF SCIENCE.

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EXPERIMENTS ON THE SIGHT AND SMELL OF VULTURES.

An account of some experiments made on the habits of the vultures inhabiting Carolina, the turkey buzzard, (CATHARTES *aura*) and the carrion crow, (CATHARTES *atratus*) particularly as it regards the extraordinary powers of smelling ascribed to them. By Dr. J. BACHMAN of Charleston, S. C.

Although the vultures inhabiting the southern states are among the most common of our larger species of birds, remaining with us the whole year, building their nests in the hollows of fallen trees, and stumps around our plantations—resting on our house tops and seeking their food around our markets and in the very streets of our cities, yet it appears that a difference of opinion exists with regard to some of their faculties and particularly whether they find their food by their sense of smelling or of vision.

It has been the long established belief of all civilized as well as barbarous nations since the time of the Romans, that vultures were possessed of extraordinary olfactory powers by which they are enabled to scent their food at the distance of many miles. Whether this opinion was founded on truth, or whether it was a vulgar error having its origin with the thousands of others which have been handed down from age to age, originating in ignorance or superstition, cannot be fully ascertained, until satisfactory experiments are made on the olfactory powers of the vultures of southern Europe, Asia, and Africa.

All the writers on American ornithology have ascribed to the vultures of the United States the same extraordinary powers of smell, with the single exception of Audubon, who in a paper published in Jamison's Journal, Edinburgh, 1826, detailed a series of experiments made in America several years previously, from which he came to the conclusion that these birds were guided to their food altogether by the eye. He found by repeated experiments that vultures were attracted by a dried deer skin stuffed in imitation of that animal, and that in these instances where no effluvium could exist they could not have been led to it by the scent. He next concealed a dead animal in the heat of summer in such a way that it could not be observed by the vultures, although the scent was not obstructed; here it was suffered to decay without having been disturbed by these birds.

He next procured two young carrion crows, which he tamed and reared in a cage, the back part of which was so closed that objects approaching from that side could not be seen. Whenever he came with food to the front of the cage the birds jumped at the bars, commenced hissing, and putting their bills towards each other as if expecting to be fed mutually, as their parents had done. When however, the cage was silently approached from behind, with small animals and flesh, however putrid, no movement was made by the birds to indicate their having observed by the effluvium, that their favorite food was near.

The sentiments thus expressed by Audubon were at the time, and are still treated with a good deal of severity, both in Europe, and in his native country.

It has always appeared to me an act of injustice to condemn any man for expressing an opinion on subjects of natural history, merely because, from his own investigation he had arrived at different conclusions from those who had lived before him; and particularly where the error could be so easily detected by instituting a similar course of experiments; such a course of conduct would be a bar to all improvements and the sincere inquirer after truth would have to contend against a host of prejudices from those, who, adopting the opinions of others, refused to make those inquiries which would satisfy their own minds, that their opinions were fortified and confirmed by experience.

The details of the experiments made by Audubon, are of such a character, that either the conclusions at which he arrived are correct, and our vultures do not possess extraordinary olfactory powers, or he has given to the world an unfair statement, and is therefore not a man of veracity, and undeserving of the confidence of the community. Should such an impression be unhappily made on the public mind, it will not only have a tendency to destroy his usefulness, but will deprive him of those pecuniary resources, which are requisite to enable him to carry on successfully a very expensive publication—a publication which cannot fail to prove a highly important acquisition to the natural history of our country, and to establish an abiding monument to the fame of its author.

The lovers of American ornithology who feel under many obligations to the man who has devoted so many years of his life to this interesting and beautiful department of natural science, will not condemn him unheard; and those particularly of our southern states would show themselves very careless observers of nature and very indifferent to the character and fame of Audubon, if, possessing as they do, so many favorable opportunities for investigation, they did not institute some inquiries, not only to do an act of justice to a distinguished naturalist, but to ascertain an interesting fact in natural history.

No one who will read Mr. Audubon's paper on the subject, containing a full detail of a number of experiments on the habits of our vultures, can deny that if he intended to deceive the world, he certainly chose a subject where detection was easy and certain—in our southern states these birds are so abundant as to have become a nuisance, particularly in our cities. It is but an act of justice to Mr. Audubon to state that in his frequent visits to Charleston, he has fearlessly invited investigation on this disputed subject.

During his absence he wrote to me on several occasions, urging me to make further experiments; a number of engagements prevented me from devoting as much time to the subject as was necessary to investigate it in such a manner as to prove satisfactory to my mind, and I postponed it to a more leisure period. On the recent visit however, of Mr. Audubon, I consented to institute these inquires, in the prosecution of which I was aided by the intelligence and experience of such distinguished naturalists and men of science as could be obtained.

It will be observed that our experiments were confined to our two species of vulture (CATHARTES *aura* and CATHARTES *atratus*) which are so common in Carolina. There are three other species

which have been described by authors to frequent the southern and western portions of the United States. The VULTUR *Californianus*, (Lath.) undoubtedly exists west of the Rocky Mountains, as specimens were procured near the Columbia river, by Mr. Douglass; but we have no evidence of its existing eastward of that great chain. The existence in the United States of the great condor, CATHARTES *gryphus*, is only conjectured from a bill, and a quill feather brought by Lewis and Clarke, from the Columbia river, and deposited in the Philadelphia museum. The beautiful king of the vultures (CATHARTES *papa*) is said to appear occasionally in Florida, upon what authority I am unable to state; none of the gentlemen, however, who have resided at Key West and other portions of Florida for many years, have been able to find this bird. Mr. Audubon, however, in his indefatigable exertions in that country, found a different species which was not known before to exist in the United States: the POLYBORUS *vulgaris*, of which I have received several specimens through the kindness of Dr. B. B. Strobel and Dr. Litner, that had been procured between Tampico bay and Key West. Whatever powers of smelling these (with us rare species) may possess, I am unable to state from actual experiment; but it will probably be discovered that their olfactory powers have been as much overrated as was the size of the famous condor whose quill feathers, even as late as 1830, were described as "twenty good paces long," and which on actual measurement, has been found of less dimensions than that of several species existing on the eastern continent—but laying aside speculations on a subject which time and further observation only can decide, I proceed to a detail of facts that have come under my own observation.

(*To be continued.*)

POWERS OF DIGESTION.

From Smellie's Philosophy of Natural History.

Spallanzani, who made a great number of original observations and experiments upon digestion, directed his attention to this function, as taking place in animals with three different kinds of stomach. 1. Those with strong muscular stomachs or gizzards, as hens, turkeys, ducks, geese, pigeons &c. 2. Those with stomachs of an intermediate structure, as crows, herons &c. 3. Those with membranous stomachs, as man, the mammalia, many birds, particularly the accipitrine, reptiles, and fishes.

1. In his experiments upon birds with strong gizzards Spallanzani forced down their throats small glass and metal balls and tubes, filled with grain, and perforated with many holes in order to give free admittance to the gastric juice. The grain was in its entire state. At the end of different periods varying from twenty-four to forty-eight hours, the animals were killed and the balls examined. No change had taken place in the grain. There was no diminution of size, and no marks of dissolution were to be seen. In all his experiments, which were numerous, the event was uniformly the same. Suspecting that although the gastric juice might be unable to dissolve the grains in their entire state, it might act as a solvent upon them when sufficiently masticated or bruised, he repeated his experiments, filling his balls with bruised grain. In all his numerous trials upon this plan, he invariably found, that the grain was more or less dissolved, in proportion to the time the balls were allowed to remain in the stomach.

When tin tubes full of grain were thrust into the stomachs of turkeys, and allowed to continue there a considerable time, they were found to be broken, crushed, and distorted in such a manner, as to evince the existence of a most powerful comminuting force. "Having found," says Spallanzani, "that the tin tubes which I used for common fowls were incapable of resisting the stomach of turkeys, and not happening at that time to be provided with any tin plate of greater thickness, I tried to strengthen them, by soldering to the ends two circular plates of the same metal, perforated only with a few holes for the admission of the gastric fluid. But this contrivance was ineffectual; for after the tubes had been twenty hours in the stomach of a turkey, the circular plates were driven in, and some of the tubes were broken, some compressed, and some distorted in the most irregular manner."

These smooth substances, although so violently acted upon, could not injure the stomach, and Spallanzani was therefore induced to try the effect of sharp bodies. He found that the stomach of a cock in twenty-four hours broke off the angles of a piece of rough, jagged glass, without laceration or wound. A leaden ball into which twelve strong needles were firmly fixed, with their points projecting about a quarter of an inch from the surface, was then covered with a case of paper and forced down the throat of a turkey. The animal discovered no symptons of uneasiness, and at the end of a day and a half, when the stomach was examined, the points of the twelve needles were broken off close to the surface of the ball, except two or three, which projected a little. Two of these points were discovered among the food, the other ten had probably passed out of the body.

In another experiment still more cruel than this, twelve small lancets were fixed in a similar manner, into a leaden ball, and forced down the throat of a turkey cock. After eight hours the stomach was opened, but nothing appeared except the naked ball, the lancets having been broken to pieces. The stomach itself was found perfectly sound and uninjured in both these experiments.

It is common in the gizzards of many birds, to find small stones, which have been supposed to assist in breaking down grain and other hard substances into small fragments, to prepare the way for their digestion. Spallanzani has endeavored to prove that the muscular action of the gizzard is equally powerful without the stones. In a number of pigeons which he had fed from the egg himself, so as to prevent them from obtaining stones, he found that tin tubes, glass globules, and fragments of broken glass, were acted upon in the same way as in ordinary circumstances; and this happened also without any laceration of the stomach. It is the opinion, however, of the best physiologists, notwithstanding these experiments, that stones are extremely useful in the comminution of grain, and other substances which constitute the food of fowls, though not absolutely essential.

2. In stomachs of an intermediate kind, such as those of crows, ravens &c. the power and action of their coats upon substances contained within them, were found to be greatly inferior to those of the strong muscular stomachs. But little alteration was produced upon the tubes of tin, but when made of lead, they were evidently compressed and flattened. When unbroken grains and seeds were enclosed in perforated tubes and thrust into their stomachs, no change whatever was produced, no solution appeared to have taken place. But when the same substances were bruised into a coarse flour, so as to get rid of their husks, a very sensible diminution of their bulk took place, and on being several times introduced, they were finally entirely dissolved. Wheat and beans, when eaten voluntarily by the crow, offered similar phenomena. Before swallowing, the animal set them under its feet, and broke them in pieces by repeated strokes of its beak and then they were very well digested. But when the same seeds were swallowed entire they were generally vomited up, or voided unaltered. Similar experiments were made with French beans, pease, nut

kernels, bread, apples, and different kinds of flesh and fish; and corresponding results were obtained.

3. Spallanzani finished his experiments on digestion with those animals which have thin membranous stomachs, as man, quadrupeds, fishes, reptiles, and some birds. In these, the coats of the stomach seemed to have little or no mechanical action upon their contents; the gastric juice being fully sufficient to break down the food and reduce it to a pulp.

In the ruminating animals, as the sheep, the ox &c. he discovered that the gastric juice speedily dissolved vegetables, but made no impression upon beef, mutton, and other animal bodies. From these last experiments, it appears, that the different tribes of animals are not less distinguished by their external figure, and by their manners, than by the quality and powers of their gastric juices. Dogs are unable to digest vegetables, and sheep and oxen cannot digest animal substances. As the gastric juice of the human stomach is capable of dissolving, nearly with equal ease, both animals and vegetables, this circumstance affords a strong, and almost irresistible proof, that nature originally intended man to feed promiscuously upon both.

Live animals, as long as the vital principle remains in them, are not affected by the solvent powers of the stomach. "Hence it is," Mr. Hunter remarks, "that we find animals of various kinds living in the stomach, or even hatched and bred there; but the moment that any of these lose the living principle, they become subject to the digestive powers of the stomach. If it were possible, for example, for a man's hand to be introduced into the stomach of a living animal, and kept there for some considerable time, it would be found, that the dissolvent powers of the stomach could have no effect upon it; but if the same hand were separated from the body, and introduced into the the same stomach, we should then find, that the stomach would immediately act upon it. Indeed, if this were not the case, we should find that the stomach itself ought to have been made of indigestible materials; for, if the living principle was not capable of preserving animal substances from undergoing that process, the stomach itself would be digested. But we find, on the contrary, that the stomach which at one instant, that is, while possessed of the living principle, was capable of resisting the digestive powers which it contained, the next moment, viz. when deprived of the living principle, is itself capable of being digested either by the digestive powers of other stomachs, or by the remains of that power which it had of digesting other things.

DIFFERENT EFFECTS OF HEAT.

In those ancient days so much boasted by the moderns, when the philosophers were content with believing that the sun was a fiery cloud of a foot in diameter, or at most no larger than Peloponnesus; one of the most renowned sages in the midst of the gardens of the Academy, was theorising with great confidence and power. He was explaining, in brief terms, how all the worlds which roll in space, were created. A young disciple of Plato, accustomed to reason by proposing questions, as is the fashion of some of his modern disciples in a part of our country, thus addressed him:—"O sage! condescend to enlighten me in these mysteries; how it happens, that the rays falling upon wax cause it to drop in threads of gold, while the same heat, applied to moist clay, changes it to stone? Or that man, moving under the full ardor of these rays, is covered with sweat, while the same heat dries up the fountains and streams? Or that the same light reddens the rose, stripes the tulip, blanches the lily, and browns the shepherd girl? Whence is it that the same cause operates such opposite effects?" The disciple of Plato ceased; and the sage world-builder not being able to resolve the questions of a scholar, touching the most obvious matters of daily observation, retired overwhelmed with shame from the Academy.

In these more fortunate days, we have in our ordinary schools young doctors of sixteen, and fair Euclids at twelve, who standing at the black-board during an examination, are able at least to discourse learnedly upon these points of philosophy, if they cannot satisfactorily explain them. *Flint's Lectures.*

THE ADVOCATE OF SCIENCE.

Second Month 6, 1834.

TO READERS AND CORRESPONDENTS.

We commence an interesting article on our first page, respecting the sight and smell of vultures. The experiments which have been made by its enterprising author, will prove an acceptable repast to our readers. The paper was transmitted to two or three associations in this city, as well as to a number of journals in different parts of the country, in which it has been published. We regret that its length precludes us from giving it entire.

We are pleased again to hear from our correspondent L. H. P. We will have a few words to say to him in our next number, in reply to his interesting essay.

The problems of L. are worthy attention. We hope some of our readers will give solutions of them in the coming paper.

The questions of Barbara came to late for insertion this time, but shall appear in the next number.

"S. L. M." will find her inquirers responded to by "Boreas." We hope she will forward to us some more interesting questions, if she meets with inexplicable "phenomena" in the course of her "domestic employments."

THE PERIODICAL LOCUSTS—CICADA SEPTEMDICUM.

The present year is the time when we may look for the regular visit of the periodical locust. The last visitation of this singular insect was in 1817, when they began to make their appearance in the latter part of the fifth month. As 17 years is its regular period, it will return of course, in 1834. We intend to furnish our readers with some description of the animal; its habits and peculiarities, which are very interesting.

The following is the summary we promised in our last number, which has been kindly furnished by a friend. The first fourteen years was taken by P. Legoux, at Spring Mill, about 14 miles from this city, and the succeeding ten years at the Pennsylvania hospital. In comparing the estimates for the three last years with our own, we observe a considerable difference. Thus, the table gives 43.940 inches of rain for '31; ours gives 59.17 inches of rain and 66.87 of water, which is the water formed by the snow, added to the quantity of rain. In '32, we observe in the table, 30.870 inches, while our summary exhibits 50.20 of rain and 51.75 of water; for the year '33, we have 48.550 inches in the one case, and 54.92 inches in the other.

It is evident a great mistake has occurred somewhere. We cannot suppose the quantity of rain which fell in Philadelphia in these years was less by ten inches and more, than that which fell in Wilmington during the same time; which we must believe, if we believe both estimates to be correct. We know but little of the hospital guage; and that little is comprised in the fact, that some of the patients, who are not so crazy but that they are permitted to have the freedom of the yard, occasionally feel induced to return the water in the guage to its mother earth, before taking correct observations, or permitting others to do it. Hence we infer the possibility of the meteorological journal of the hospital being incorrect. As to the guage at Wilmington, we can vouch for its correctness; the gentleman who superintends it is very careful and correct in his observations.

We hope he will give us a table of the rain which has fallen there for the last ten years.

1810	32.656	1822	29.864
1811	34.968	1823	41.815
1812	30.300	1824	38.740
1813	35.625	1825	29.570
1814	43.135	1826	35.140
1815	34.666	1827	38.500
1816	27.947	1828	37.970
1817	36.005	1829	41.850
1818	30.177	1830	45.070
1819	23.354	1831	43.940
1820	39.609	1832	39.870
1821	32.182	1833	48.550

THE ADVOCATE OF SCIENCE.

A few numbers back we intimated an intention of changing the form of the Advocate, at the conclusion of the present volume. We will now proceed to state what those alterations will be.

From a semimonthly, we purpose to make it a monthly journal of forty-eight large octavo pages to a number.

The popular style of its essays will not be altered, but further illustrated by means of wood cuts.

Its essays will not be confined to any particular subjects, but will embrace all connected with the sciences; such as Zoology, Comparative Anatomy, Conchology, Botany, Geology, Mineralogy, Chemistry, Meteorology, Agriculture &c. &c. Arrangements have been made to procure suitable popular contributions on all those subjects, illustrated with figures.

Critical notices on literature, and concise reviews of new scientific works and periodicals will also be given. In this latter particular we shall pursue a course strictly compatible with justice, praising none whose merits are doubtful, and censuring only where the interest of science demands it.

The essays on Geology which have appeared in the present volume will be republished, with such additions and improvements as may suggest themselves to the author. It has been intimated to us that this would prove acceptable to our readers, particularly on account of the diagrams which will accompany them.

With these additions and improvements, the subscription price will be raised to two dollars a year. Its title will be modified or changed, should we conclude on the propriety of a change. The work will be decidedly the cheapest of the kind in the United States or Europe. The execution will be equal, if not superior, to that of any similar American publication, and particular care will be taken to give correct illustrations, for which purpose first rate artists will be employed.

Finally, we would remind our friends that to accomplish this important object, it is necessary for them to cooperate with us in procuring additional subscribers; not less than 2,000 will bear us out in the undertaking. And as we believe it will be to their interest as well as to our own, to have a journal conducted in this manner,—of which kind there is none in the United States,—we hope no exertions will be spared, on their part, to promote the execution of our design.

To the agricultural portion of the community, we would particularly urge the propriety of being interested in our scheme. For too frequently do we see the operations of the farmer conducted without a due regard to that economy which science would teach, and too often are his designs frustrated, and his hopes disappointed, for want of the knowledge of a few simple scientific principles.

The first number of the work will appear in the course of one or two months, and will serve as a partial specimen of its future character. It may be proper to state, that unless the number of subscribers previously mentoned be obtained, our limited patronage will prevent us from giving the proposed embellishments.

We are aware that the great irregularity which has heretofore attended the publication, has been of considerable disadvantage to it. But we have had to contend with more than the ordinary difficulties which are incident to the execution of new periodicals; and as often as punctuality has been promised, with the hope that these difficulties were at an end, so often have new obstructions appeared, which nothing but experience can enable an editor to provide against. And with what we have already learned, we confidently believe it will not be flattering our patrons with an expectation which will never be realized, were we to say that our new publication will be issued at the commencement of every month.

IMPORTANT DISCOVERY IN CASTING IRON.

The Brattlesburg Inquirer relates a discovery made by the proprietor of an extensive iron foundry in Syracuse, N. Y. in relation to the casting of iron. The best kind of earth, used in foundries is brought from Canada; the individual allluded to analised this and found it to contain a proportion of blue clay. From this, he instituted a series of experiments, the results of which proved that the best possible composition for castings was composed of fine sand and blue clay, in the proportion of nine parts of the former to one of the latter. With this the most delicate castings came out perfectly free from sand, and required no vitriol to clean them. He discharged ten of his cleaners on the spot; and he estimates that the discovery will make a considerable saving in the expense of iron foundries;—in the diminution of labor, the cheapness of sand, and the disuse of vitriol in the process of cleansing.

For the Advocate of Science.

SCIENTIFIC PROBLEMS.

1. *Long screw drivers.*—It is a fact well known to mechanics, that with a long *screw driver*, a much greater power may be exerted than with a short one. One may turn a screw with a long instrument, without the least difficulty, which he could not stir with a short one, in all respects similar, except in weight. What is the rationale of this?

2. *The stoppage of water in aqueducts.*—It often happens that water will not flow through a leaden, or other pipe, laid with due reference to the pressure and motion of fluids, until it is forced through, or in other words, until the air is forced out, by some suitable apparatus.—What is the cause of this?

3. *The earth a spheroid.*—The spheroidal figure of the earth, is inferred from the fact, that the vibrations of a pendulum, of a given length, are more rapid in high latitudes, than at the equator;—a necessary consequence of an increase of gravity. This increase of gravity as we approach the poles of the earth, is attributed to the greater proximity of those parts, to the *centre* of the earth, as if all the power of attraction resided there. Now since the principle of gravity pervades every part of the earth, and all the parts exert a mutual attraction upon each other, why will a body weigh more, placed on the *flattened* part, where the earth is *thinnest*, and where a considerable portion of the attracting matter, is removed from a perpendicular position, and disposed so as to act only in a direction approaching to horizontal, than if placed on the equator, where there would be less matter in a lateral, but more in a perpendicular direction?

The earth revolves round its axis, once in twenty-four hours; giving to bodies on its surface, a certain tendency to fly off. This tendency is greatest at the equator, growing less and less, as we approach the poles, where it is nothing, and must necessarily cause a proportional diminution in the weight of bodies. Should the earth revolve on its axis seven or eight times as rapidly as it now does, its gravity at the equator would be completely overcome, and

bodies would have no weight. Has this cause been taken into the account, in determining the equatorial and polar diameters of the earth? and if it has, how much allowance is made on account of it?

P.

JOURNAL OF THE WEATHER

For 1st Month, January, 1834, kept at Wilmington Del.

D.	☽ H.	M.	BAROMETER.	WIND.		RAIN	SNOW	OBSERVATIONS.
●								
1	3	3	29.80	N.W	1			Cloudy—(thin.)
2	3	40	.68	N.E	2			.70 Rain—cloudy.
3	3	25	.52	N.W	4			Cloudy—clear.
4	2	17	30.24	N.W	2			Clear—cloudy.
5	1	41	.96	N.N.E	1			Snow—clear.
6	1	17	30.00	N	1			Cloudy—snow.
7	0	52	.80	N.E	1			Cloudy—clear.
8	0	36	30.14	S	0			Clear—cloudy—clear.
9	0	34	.00	N.E	1			Hail and snow—cloudy.
10	0	34	29.80	N.E	1			Rain.
11	0	33	.80	N.E	1			1.50 Sleet and rain.
12	0	33	.73	N.E	1			Cloudy—clear.
13	0	33	.40	N.E	1			Clear.
14	0	33	30.00	N.W	4			Clear.
15	0	33	.14	N	2			Cloudy—clear.
16	0	33	29.96	N	2			.40 Cloudy—rain.
17	0	40	.85	W.S.W	3			Cloudy—clear.
18	0	50	.56	S.W	3			Cloudy—some rain.
19	0	50	29.85	S.W	3			Cloudy—snow.
20	0	50	.84	N.E	1			Cloudy—clear.
21	0	50	.83	N.W	3			Clear.
22	0	50	.98	W.N.W	3			Clear.
23	1	14	30.09	N.W	3			Partly clear.
24	1	31	.06	N.W	2			Partly clear—snow.
25	2	18	.07	N	1			Cloudy—snow.
26	3	01	29.94	N.W	2			Snow—clear.
27	2	51	.78	N.W	1			Mostly clear.
28	9	39	30.00	S.W	1			Clear.
29	10	28	.34	N	1			Clear.
30	10	34	.24	N.E	1			.05 Cloudy—rain.
31	11	45	29.93	N.E	1			Partly clear.

The foregoing observations on the thermometer, barometer and winds, are taken three times a day; at sunrise, mid day and 11 P. M.

Note.—In the column representing the force of the wind, 0 denotes calm, or nearly so, 1 a light breeze, 2 a breeze, 3 a wind, 4 a high wind, and 5 a very high wind. The letters R, T and L denote rain, thunder and lightning respectively.

SUMMARY.

Average at sunrise, thermometer		23 84°	—barometer	29.985	inches.
Do. at mid-day,	do.	33 87	do.	29 974	do
Do. at 11 P. M.	do.	26 42	do.	29.975	do.
Monthly mean, (2 obs.)	do.	23 855°	do.	29 98	do.
Maximum, (18th)	do.	56°	do. 16th	30 48	do.
Minimum, (25th)	do.	8°	do 2d	29 35	do.
Range,	do.	48°	do.	1.13	do.
Warmest day, 18th,	do.	53°			
Coldest day, 25th,	do.	14°			

Northerly Winds prevailed, (proportion,)	14 days	Whole days clear,		5
		Days on which rain fell,		5
Easterly, do.	8 do	" " snow "		6
Southerly, (S to W) do.	9 do	Quantity of rain,		2.065 in.
Proportion of clear weather,	13 do.	" " snow,		7 5 "
Proportion of cloudy weather,	18 days	" " water,		3.54 "

Observations.—No auroras nor electrified clouds. Seven easterly storms, four of them accompanied with snow, two with rain, and one with a little rain; nearly all of them were transient and light. One of them, however, lasted three days, and was followed by a gale from N. W., which was very destructive at Buffalo, N. York. Winds very variable, both in direction and force. Rains and snows quite frequent, but almost uniformly in small quantities. Temperature, cold for the first week, and afterwards moderate till the 21st, when it became very cold, and continued so a week. The navigation of the Delaware was obstructed from the 5th to the 19th, and again for a few days toward the end of the month.

For the Advocate of Science.

THE MOON HAVING TO TRAVERSE A RESISTING MEDIUM.

It may be expected that I should say something more on this subject. It will be remembered, my original remarks on it had reference to another point—the planetary theory of meteorites. My proposition that the moon probably has to traverse a resisting medium, was founded on the fact that the moon has been for thousands of years, and for ought that is known, from its very creation, and is still gradually approaching the earth. As to the demonstrations of La Place and others, to which the editor has alluded, I confess I was not aware of the extent of celestial irregularities, to which they are supposed to be applicable. And as I am still ignorant of the process of reasoning by which La Place has discovered in the particular case in question, that an acceleration which has as yet given no indications of a change, is hereafter to be reversed, I must be allowed to suppose it possible, that the causes at present in operation are permanent. But even allowing that the acceleration which has been observed is satisfactorily accounted for, that does not prove, that there has never been any acceleration unobserved. An acceleration of a single second in ten thousand years, unaccounted for, would leave room for supposing the moon to meet with resistance. Will the advocates of the materiality of light and heat allow these demonstrations to be conclusive against their theory? Why did not that theory fall to the ground the instant those discoveries were made known? If they were of such a character as to preclude the possibility of the presence of *atmospheric* resistance, they must with equal certainty apply to every other material resistance; and must prove either that light and heat, are not present at the moon, or that they are not material. That they are material, I certainly am not disposed to contend. I only claim that if the doctrines of La Place are not sufficient to prostrate that theory, they certainly cannot be conclusive against the one I am defending.

The editor argues farther, that the density of the atmosphere diminishes so rapidly, that "we should probably not have to ascend many hundred miles, before we should find that the attraction of gravitation, overcomes its elasticity; or before its elasticity arrives at its farthest limit," and that "here of course the atmosphere will cease to exist." That there is a limit to the elasticity of the atmosphere (aside from the force of gravity) we certainly have no evidence. And why gravity should overcome that elasticity, I cannot conceive. Gravity it is true confers the property of *weight* to the atmosphere, as well as to every thing else. And the various portions of the atmosphere are compressed, or their elasticity counterbalanced, not destroyed, but increased rather by the *weight* of the parts above. But what shall prevent or limit the expansion of the uppermost stratum, where there is no weight above? and where shall the uppermost stratum be the dividing line between elasticity, and non-elasticity—between atmosphere and no atmosphere.

Again, it is a well known principle, that gravity is only as the quantity of matter. So that allowing it to have a tendency to counteract the repulsive force of an infinitely elastic fluid, independently of the weight of the superincumbent matter, still the power itself diminishes, just as it wants matter to act upon. Each particle of the air is affected only by its own gravity. Consequently every particle whether rare or dense, must be alike free to the exercise of its natural elasticity. But farther, gravity itself decreases, and decreases rapidly too, as we ascend from the earth; so that allowing the quantity of matter to be the same, it would be less and less under the influence of gravity, the farther it should be removed from the earth. At the distance of the Moon from the earth, the force of gravity

upon a given quantity of air, would be 3600 times less than upon the same quantity at the surface of the earth.

With these facts in view, I am at a loss to conceive, how or where there can be a limit to the atmosphere—how a perfectly elastic fluid can exist in close juxtaposition with a perfect vacuum. I cannot conceive of a particle of air, possessing elastic force sufficient to resist its own gravity, and at the same time, to sustain the weight of the air above; and yet the elasticity of the next particle above so weak as to be overcome by its own gravity, without having another particle above to support.

After all, I do not mean to insist that the moon does positively have to traverse a resisting medium. I did not assert this in the first place. But although I admit that it may be impossible ever to demonstrate that the moon meets with atmospheric resistance, yet I must be allowed to believe, as I have heretofore remarked, that it would at least *be quite as difficult* to prove that it does not.

L. H. P.

For the Advocate of Science.

ANSWERS TO THE QUERIES OF S. L. M.

"1. Why does the sun extinguish the fire?"

Answer. Fire burns, or to speak more philosophically, the process of combustion is performed, by virtue of the oxygen gas which exists in the atmosphere, and which constitutes one fifth part of the air. During combustion, the burning substance absorbs this oxygen. The rays of the sun also possess the property of absorbing oxygen, and therefore they prevent the fire from burning as rapidly as it otherwise would, by depriving it of the necessary supply of oxygen. Properly speaking, the sun cannot actually extinguish the fire, though it has power to retard the burning of it. I have more than once observed this fact, before I heard it explained; and the circumstances were such as not only to perplex my mind to account for the cause, but also to worry me a little by preventing my success in building a fire. It has repeatedly fallen to my task to burn the dry weeds in the garden, and to set fire to the brush-heaps in a clearing; and I well recollect blowing and blowing at a coal in order to produce a blaze, until my head seemed to whirl round like a top. After several experiments of this kind, I assured myself that my difficulties were owing chiefly to the rays of the sun, which shone directly on the coal that I was blowing.

"2. Why does a damp day make the chimney smoke?"

Answer. Several causes conspire to accomplish this sad catastrophe. Let us first examine on what depends the "drawing" of a chimney. When a chimney is properly constructed and favorably situated, a draught may be observed in it whenever the wind blows, even when it contains no fire. This is owing to the action of the wind at the top of the chimney.—When the weather is perfectly calm it is impossible for a chimney to draw, unless it is warmed or supplied with heated air by a fire. In this case the heated air from the fire or stove rises by its levity, and forms a current. Hence we often find it difficult to kindle a fire in a stove, although the chimney draws well after the fire begins to burn. When a chimney is cold and damp, as it is apt to be in damp weather, the air in it so far from rising as it should do, *falls*, on account of its weight, and produces a current downwards, causing the chimney to smoke at the wrong end, as a popular modern writer would say. This is the most frequent cause of the calamitous occurrence complained of by S. L. M.

"3. Why does the wick of the candle or lamp become more incrusted at one time than another?"

Answer. Because of the dampness of the atmosphere. If the air be charged with moisture, combustion does not go on as rapidly as when it is dry; consequently the least combustible parts of the oil or tallow are not perfectly consumed, and form a crust of charcoal on the wick. For the same reason the flame of the lamp or candle sputters in damp weather. Hence the old fashioned weather prophets predict rain or foul weather when the candle sputters or becomes incrusted—an indication much less equivocal than another which is often talked of by children, who find in the wick of the lamp, signs of letters which they are to receive.

BOREAS.

DR. GODMAN'S RAMBLES OF A NATURALIST.

Continued from page 174.

Had I succeeded in obtaining some living crows, they were to be employed in the following manner. After having made a sort of concealment of brushwood within good gunshot distance, the crows were to be fastened by their wings on their backs, between two pegs, yet not so closely as to prevent them from fluttering or struggling. The other crows who are always very inquisitive where their species is in any trouble, were expected to settle down near the captives, and the latter would certainly seize the first that came near enough with their claws, and hold on pertinaciously. This would have produced fighting and screaming in abundance, and the whole flock might gradually be so drawn into the fray, as to allow many opportunities of discharging the guns upon them with full effect. This I have often observed, that when a quarrel or fight took place in a large flock or gang of crows, a circumstance by no means unfrequent, it seemed soon to extend to the whole, and during the continuance of their anger, all the usual caution of their nature appeared to be forgotten, allowing themselves at such times to be approached closely and regardless of men, fire-arms, or the fall of their companions, continuing their wrangling with rancorous obstinacy. A similar disposition may be produced among them by catching a large owl, and tying it with a cord of moderate length to the limb of a naked tree in a neighborhood frequented by the crows. The owl is one of the few enemies which the crow has much reason to dread, as it robs the nests of their young, whenever they are left for the shortest time. Hence, whenever crows discover an owl in the day time, like many other birds, they commence an attack upon it, screaming most vociferously, and bringing together all of their species within hearing. Once this clamor has fairly begun and their passions are fully aroused, there is little danger of their being scared away, and the chance of destroying them by shooting is continued as long as the owl remains uninjured. But one such opportunity presented during my residence where crows were abundant, and this was unfortunately spoiled by the eagerness of one of the gunners, who in his anxiety to demolish one of the crows, fixed upon some that were most busy with the owl, and killed it instead of its disturbers, which at once ended the sport. When the crows leave the roost, at early dawn, they generally fly to a naked or leafless tree in the nearest field, and there plume themselves and chatter until the daylight is sufficiently clear to show all objects with distinctness. Of this circumstance I have taken advantage, and several times got good shots at them in this way. During the day time, having selected a spot within proper distance of the tree frequented by them in the morning, I have built with brushwood and pine bushes a thick, close screen, behind which one or two persons might move securely without being observed. Proper openings, through which to level the guns, were also made, as the slightest noise or stir could not be made at the time of action, without a risk of rendering all the preparations fruitless. The guns where all in order and loaded before going to bed, and at an hour or two before daylight, we repaired quietly to the field and stationed ourselves behind the screen, where, having mounted our guns at the loop-holes to be in perfect readiness, we waited patiently for the daybreak. Soon after the gray twilight of the dawn began to displace the darkness, the voice of one of our expected visitants would be heard from the distant forest, and shortly after a single crow would slowly sail towards the solitary tree and settle on its very summit. Presently a few more would arrive singly, and in a little while small flocks followed. Conversation among them is at first rather limited to occasional salutations, but as the flock begins to grow numerous, it becomes general and very animated, and by this time all that may be expected on this occasion have arrived. This may be known also, by observing one or more of them descend to the ground, and if the gunners do not now make the best of the occasion, it will soon be lost, as the whole gang will presently sail off scattering as they go. However, we rarely waited till there was a danger of their departure, but as soon as the flock had fairly arrived and were still crowded upon the upper parts of the tree, we pulled triggers together, aiming at the thickest of the throng. In this way, by killing and wounding them, with two or three guns, a dozen or more would be destroyed. It was of course needless to expect to find a similar opportunity in the same place for a long time afterwards, as those which escaped had too good memories to return to so disasterous a spot. By as-

mining other situations at considerable distances, we could every now then obtain similar advantages over them.

About the years 1800–1–2–3–4, the crows were so vastly accumulated destructive in the state of Maryland, that the government, to hasten ir diminution, received their heads in payment of taxes, at the price of e cents each. The store-keepers bought them of the boys and shooters, o had no taxes to pay, at a rather lower rate, or exchanged powder and for them. This measure caused great havoc to be kept up among n, and in a few years so much diminished the grievance, that the price s withdrawn. Two modes of shooting them in considerable numbers e followed and with great success; the one, that of killing them while the wing towards the roost, and the other attacking them in the night en they had been for some hours asleep. I have already mentioned the larity with which vast flocks move from various quarters of the coun- to their roosting places every afternoon, and the uniformity of the route pursue. In cold weather, when all the small bodies of water are en, and they are obliged to protract their flight towards the bays or sea, ir return is a work of considerable labor, especially should a strong wind w against them; at this season also, being rather poorly fed, they are ecessity less vigorous. Should the wind be adverse, they fly as near earth as possible, and of this the shooters at the time I allude to took ntage. A large number would collect on such an afternoon, and station nselves close along the foot-way of a high bank, over which the crows e in the habit of flying; and as they were in a great degree screened n sight as the flock flew over, keeping as low as possible because of the l, their shots were generally very effectual. The stronger was the wind, greater was their success. The crows that were not injured found it difficult to rise; and those that diverged laterally, only came nearer to ers stationed in expectation of such movements. The flocks were eral hours in passing over, and as there was generally a considerable in- l between each company of considerable size, the last arrived, unsus- ous of what had been going on, and the shooters had time to recharge r arms. But the grand harvest of crow heads was derived from the in- on of their dormitories, which are well worthy a particular description, should be visited by every one who wishes to form a proper idea of number of these birds, that may be accumulated in a single district. roost is most commonly the densest pine thicket that can be found, erally at no great distance from some river, bay, or other sheet of water ch is the last to freeze, or rarely is altogether frozen. To such a roost, crows, which are, during the daytime, scattered over perhaps more n a hundred miles of circumference, wing their way every afternoon, and ve shortly after sunset. Endless columns pour in from various quar- and as they arrive pitch upon their accustomed perches, crowding ely together for the benefit of the warmth and the shelter afforded by the k foliage of the pine. The trees are literally bent by their weight, and ground is covered for many feet in depth by their dung, which by its ual fermentation, must also tend to increase the warmth of the roost. h roosts are known to be thus occupied for years, beyond the memory dividuals; and I know of one or two, which the oldest residents in the ter state to have been known to their grandfathers, and probably had resorted to by the crows during several ages previous. There is one reat age and magnificent extent, in the vicinity of Rock Creek, an arm e Patapsco. They are sufficiently numerous on the rivers opening into Chesapeake, and are every where similar in their general aspect. Wil- has signalised such a roost at no great distance from Bristol, Pa. and I w by observation, that not less than a million of crows sleep there tly during the winter season.

o gather crow heads from the roost, a very large party was made up, portioned to the extent of surface occupied by the dormitory. Armed double barrelled and duck guns, which threw a large charge of shot, company was divided into small parties, and these took stations, select- during the day time, so as to surround the roost as nearly as possible. ark night was always preferred, as the crows could not when alarmed ar, and the attack was delayed until full midnight. All being at their s, the firing was commenced by those who were most advantageously d, and followed up successively by the others, as the affrighted crows ght refuge in their vicinity. On every side the carnage then raged ly, and there can scarcely be conceived a more forcible idea of the rs of a battle, than such a scene afforded. The crows screaming with t and the pain of wounds, the loud deep roar produced by the raising ir whole number in the air, the incessant flashing and thundering of guns, and the shouts of their eager destroyers, all produced an effect h can never be forgotten by any one who has witnessed it, nor can it be adequately comprehended by those who have not. Blinded by the e of the powder, and bewildered by the thicker darkness that ensues, crows rise and settle again at a short distance, without being able to draw from the field of danger; and the sanguinary work is continued the shooters are fatigued, or the approach of daylight gives the sur- a chance of escape. Then the work of collecting the heads from the and wounded began, and this was a task of considerable difficulty, as ded used their utmost efforts to conceal and defend themselves. The nd half the front of the skull were cut off together, and strung in sums for the taxgatherer, and the product of the night divided according to the nature of the party formed. Sometimes the great mass of shooters were hired for the night, and received no share of scalps, having their ammunition provided by the employers; other parties were formed of friends and neighbours, who clubbed for the ammunition, and shared equally in the result.

During hard winters the crows suffer severely, and perish in considerable numbers from hunger, though they endure a wonderful degree of abstinence without much injury. When starved severely, the poor wretches will swallow bits of leather, rope, rags, in short any thing that appears to promise the slightest relief. Multitudes belonging to the Bristol roost, perished during the winter of 1828–9 from this cause. All the water courses were solidly frozen, and it was distressing to observe these starvelings every morning winging their weary way towards the shores of the sea in hopes of food, and again to see them toiling homewards in the afternoon, apparently scarce able to fly.

In speaking of destroying crows, we have never adverted to the use of poison, which in their case is wholly inadmisible on this account. Where crows are common hogs generally run at large, and to poison the crows would equally poison them; the crows would die, and fall to the ground, where they would certainly be eaten by the hogs.

Crows, when caught young, learn to talk plainly, if pains be taken to repeat certain phrases to them, and they become exceedingly impudent and troublesome. Like all of their tribe, they will steal and hide silver or other bright objects, of which they can make no possible use.

PROVISIONS OF NATURE FOR PECULIARITIES OF CLIMATE.

For the people of the frozen north, the reindeer seems to unite all the qualities of the useful animals; the fleece of the sheep, the milk of the cow, the force and swiftness of the horse, the docility and attachment of the dog, and the sobriety and patience of the ass. A little moss satisfies this excellent servant, that attends the inhabitants in the midst of the snows, as the camel serves his master in the midst of the sandy deserts.

If the reindeer has rendered the northern regions of the globe habitable, the birch tree furnishes materials to conquer it. From the first, the Laplander fabricates vessels, cordage, clothing, and the long shoes with which he glides like an arrow, over the frozen summit of his granite mountains. The bark of the second furnishes canoes, and a covering for his roof like tiles, a kind of flour which nourishes him as bread, a fragrant oil, and a beer or wine like that of the palm. In fact, as the reindeer is the camel, the birch is the palm of these regions. The feeble Laplander, whose form and movement might seem to indicate want of courage, forms a light skiff of the bark of this tree, and throws himself fearlessly upon the tumultuous bosom of the sea, in pursuit of the huge whale floundering among the billows. Nothing can exceed his calm courage and address in this formidable encounter. Sometimes he seems swallowed up between the mountain surges, but is soon seen floating again on the abyss. The enraged animal strikes with irresistible force with his simicircular tail. But, as agile on the water as a duck, he evades the blow, and ceases not to make war upon the huge monster, until he is seen towing the insensible hulk to the shore. His friends line the strand with acclamations of joy, and the whole tribe is enriched with the spoils of a single fish. With the thick skin, the Laplander constructs the roof of his cabin. The flesh furnishes him food; the membranes of his intestines, a linen softer than cotton; his fat, an oil that gladdens his cabin in the long, dark nights; the tongue, articles of clothing impermeable to the rains and cold; his bones, harpoons, arrows, and knives, which serve him to destroy other whales, or pursue the game of his forests, or take the fish of his rivers and seas.—*Flint's Lectures.*

MISCELLANIES.

1. *Origin of the olive tree, according to Grecian mythology.*—The Grecian mythology states that Neptune had a dispute with Minerva as to the name of the city of Athens, and it was decided by the gods that the deity who gave the best present to mankind, should have the privilege in dispute. Neptune struck the shore, out of which sprung a horse: but Minerva produced an olive tree. The goddess had the triumph; for it was adjudged that peace, of which the olive is the symbol, was infinitely better than war, to which the horse was considered as belonging and typifying.

2. *Reverence of Boerhaave for the elder, (Sambucus.)*—The elder was formerly much employed in medicine for almost every disease. Even now its blossoms are used in popular practice very advantageously, for pectoral diseases. It is said of the great physician Boerhaave, that he had so much reverence for this plant, that he some times took off his hat in passing an elder tree.

3. *Origin of the term pippin.*—The apples called pippins were so named because they were raised from the *pips* or seeds; for this variety, like all the varieties of the apple, was first introduced from the seed and without grafting. If a number of seeds of any kind of apple be planted, the trees will bear different kinds of apples, none of them exactly resembling the parent fruit. Hence the only mode of perpetuating any particular variety of apple, or indeed of nearly every fruit, is by grafting. A grafted tree will always bear precisely the same sort of fruit as the tree from which the graft was taken.

4. *Abundance of bears in Maine.*---During the year 1833, no less than 707 bears were killed in the state of Maine. As these animals are considered a public evil, a reward is given by the state government for their extermination. The amount thus paid in the last year was 3000 dollars. We did not suppose, until this account was published, that there were more than a hundred bears in that state.

5. *Gold mines of North Carolina.*—These mines continue to be very profitable. By the report of the United States mint, it appears that the state of North Carolina furnishes more than half the quantity of gold coined there from the mines of the southern states. A larger quantity however, is actually gathered than the report of the mint exhibits; for a considerable quantity of the precious metal is sold in the neighborhood of the mines, and is not converted into coin.

6. *Nature and source of cork.*—Common cork is the produce of a species of oak, (*Quercus suber*) which grows abundantly in many parts of Europe. The outer bark of the tree, which forms the cork is taken off every eight or ten years. It is slightly charred when removed from the tree, in order to contract the pores. When charred in proper vessels, cork is reduced to the substance called *Spanish black*—the ancient Greeks and Romans were acquainted with the properties of cork, and used it for various purposes; such as floats for their nets and fishing tackle, buoys for anchors &c. When Camillus was sent to Rome, through the Tiber, during the seige by the Gauls, he had a life preserver of cork under his dress.

7. *Derivation of the term marmalade*—The word marmalade is derived from the Portuguese word for Quince, *marmelo*. Quinec trees were formerly planted in the hedges of gardens and vineyards; and marmalade, two centuries ago, seems to have been in general use, principally from a belief that it possessed valuable medicinal powers. The seeds of the quince are still freqeuntly used in medicine on account of the great quantity of mucilage which they yield to boiling water.

8. Domestic silk handkerchiefs, the product of the native mulberry, have been manufactured in Dayton, Ohio, which are said to exceed the imported ones, in durability, as three to one. The workmanship, which was superintended by M. Roe, of that place, is highly creditable to him and the others connected with it; and the appearance is very pleasing, the article being of the natural color of the silk.

9. *Growth of worms.*—The growth of some worms, which feed upon animal or vegetable substances, is extremely rapid. Reaumur remarked, that these creatures, the day after they escaped from the egg, had acquired at least double their former size. At this period, he weighed them, and found that each worm weighed seven grains; but that, on the day preceding, it required from twenty-five to thirty of them to weigh a single grain. Hence in about the space of twenty-four hours, each of these worms had become from one hundred and fifty-five to two hundred and ten times heavier than formerly. This rapidity of growth is remarkable in those maggots which are produced from the egg of the common flesh-fly.

10. *Peculiarity of the watermelon.*—The watermelon is perhaps one of the most remarkable instances that we have of the power of tropical vegetables to obtain moisture in the extreme of drought and cold in the very violence of heat. In the Indian desert between the valley of the Indus and that of the Ganges, there are many places where the surface, with the exception of here and there a crumbling stone, is nothing but sand; there is no water, except what has to be drawn from the depth of several hundred feet, and the rain monsoon sometimes passes over without refreshing the surface with one drop of water. Yet even there the watermelons, planted in the dry sand, not only vegetate, but attain to a size unknown in the most fertile places of Syria and Egypt. The diameter is often from a foot to a foot and a half, and the crops are very abundant.—*Mudie's Obs. of Nature.*

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